IN THE CLAIMS

The following list of claims replaces all previous claims in this application.

1. (amended) A biocompatible hydrogel-forming tissue-bonding adhesive composition, the composition comprising:

a polyol of functionality N, wherein said polyol is terminated with at least one polyisocyanate, said terminated polyol being in solution, wherein at least (N-1)% of said solution comprises free polyisocyanate~~, and wherein at least about 70% of the polyol is derived from ethylene oxide monomers~~.-and wherein at least 70% of the polyol is derived from ethylene oxide monomers;

characterized in that after polymerization [[, ]] upon exposure to tissue or water, the adhesive forms a hydrogel comprising, after equilibration with water or aqueous fluids, greater than 50% water by volume; and

wherein the composition is suitable for use as a biocompatible tissue-bonding adhesive composition.

2. (previously presented) The biocompatible composition as recited in claim 1 wherein N is in the range 1.5 – 8.

3. (previously presented) The biocompatible composition as recited in claim 1 wherein said polyol is a branched polypropylene oxide/polyethylene oxide copolymer.

4. (previously presented) The biocompatible composition as recited in claim 3 wherein said polypropylene oxide/polyethylene oxide copolymer contains propylene oxide units in a range of about 10% to 30% by number.

5. (previously presented) The biocompatible composition as recited in claim 3 wherein said polypropylene/polyethylene oxide copolymer contains no more than 10% propylene oxide units by number.

6. (amended) The biocompatible composition as recited in claim 1 wherein said. ~~polypropylene/polyethylene oxide copolymer contains at least 70% ethylene oxide units by number.~~ polyisocyanate is one or more of toluene diisocyanate and isophorone diisocyanate.

7. (previously presented) The biocompatible composition as recited in claim 1 wherein said polyisocyanate comprises 2,6-toluene diisocyanate.
8. (previously presented) The biocompatible composition as recited in claim 1 wherein said polyisocyanate comprises isophorone diisocyanate.
9. (previously presented) The biocompatible composition as recited in claim 1 wherein said polyisocyanate comprises an 80:20 mixture of 2,4- toluene diisocyanate and 2,6-toluene diisocyanate and about 3% of the composition is free polyisocyanate.
10. (previously presented) The biocompatible composition as recited in claim 1 wherein said polyisocyanate comprises isophorone diisocyanate and about 1.5% of said composition is free polyisocyanate.
11. (previously presented) The biocompatible composition as recited in claim 1, wherein said composition is comprised of two polyisocyanates and wherein one of said polyisocyanates comprises a free isocyanate B as an aromatic polyisocyanate and the other of said polyisocyanates comprises an aliphatic isocyanate A which is used to endcap said copolymer.
12. (previously presented) The biocompatible composition as recited in claim 11 wherein the free isocyanate B converts to an amine faster than the isocyanate A.
13. (previously presented) The biocompatible composition as recited in claim 11 wherein said free isocyanate B is more reactive with nitrogenous substances than said isocyanate A.
14. (previously presented) The biocompatible composition as recited in claim 11 wherein said free isocyanate B is of lower viscosity than said isocyanate A.
15. (cancelled)
16. (cancelled)
17. (previously presented) A biocompatible hydrogel-forming adhesive composition comprising at least two branched polyols wherein at least one of said polyols is a branched polypropylene oxide/polyethylene oxide copolymer, and wherein at least one of said branched polyols consists of a

copolymer of less than 10% polypropylene oxide and at least one of said branched polyols comprises a copolymer consisting of between about 10 and 30% polypropylene oxide, both of said copolymers of functionality 1.5-8, said copolymers being terminated with at least one polyisocyanate, said terminated copolymers being in solution, and wherein at least 1% of said solution comprises free polyisocyanate;

characterized in that after polymerization, upon exposure to tissue or water, the adhesive forms a hydrogel comprising greater than 50% water by volume; and

wherein the composition is suitable for use as a biocompatible tissue-bonding adhesive composition.

18. (previously presented) The biocompatible composition as recited in claim 17 wherein one of said polyol copolymers comprises 5% polypropylene oxide and the other of said polyol copolymers comprises 25% polypropylene oxide.

19. (previously presented) The biocompatible composition as recited in claim 20 wherein said copolymer having a lesser functionality comprises at least 25% of the number of polymer molecules of the total copolymer component.

20. (previously presented) The biocompatible composition as recited in claim 17 wherein one of said copolymers has a lesser functionality than one or more of the other of said copolymers.

21. (previously presented) The biocompatible composition as recited in claim 20 wherein one of said copolymers has functionality 2 and the other of said copolymers has functionality 3.

22. (previously presented) The biocompatible composition as recited in claim 20 wherein said copolymer of lesser functionality is less than 25% of the number of polymer molecules of the total copolymer component.

23. (previously presented) The biocompatible composition as recited in claim 22, wherein one polyol is terminated with a polyisocyanate having a first reaction rate with water R1 and another polyol is terminated with a polyisocyanate having a second reaction rate with water R2, where R1 is a faster rate than R2, both of said terminated polyols having an average functionality of 1.5-8, said

terminated polyols being in a solution, with at least 1% of said solution comprising free polyisocyanate of reactivity R1.

24. (previously presented) The biocompatible composition as recited in claim 23 wherein one of said polyols is terminated with an aromatic polyisocyanate and another of said polyols is terminated with an aliphatic polyisocyanate, both of said polyols having an average functionality of 1.5-8, said terminated polymers being in solution, wherein at least 1% of said solution comprises free polyisocyanate.

25. (previously presented) The biocompatible composition as recited in claim 24 wherein said free polyisocyanate is aromatic.

26. (previously presented) The biocompatible composition as recited in claim 25, wherein said free polyisocyanate comprises toluene diisocyanate.

27. (previously presented) The biocompatible composition as recited in claim 25, wherein said free polyisocyanate consists of one or more isomers of 2,6-toluene diisocyanate.

28. (previously presented) The biocompatible composition as recited in claim 23, wherein said composition eliminates any aromatic amines induced by reaction of water or proteins with aromatic isocyanates during polymerization, said elimination occurring by reaction of such aromatic amines with less-reactive aliphatic isocyanates capping polyols, where the number of groups of said less reactive isocyanate capped polyol is present in essentially stoichiometric amounts with respect to said the number of groups of said aromatic isocyanates.

29. (previously presented) The biocompatible composition as recited in claim 28, wherein said less reactive isocyanate capping said polyol comprises isophorone diisocyanate.

30. (previously presented) The biocompatible composition as recited in claim 29, wherein said polyol is 75% polyethylene oxide and 25% polypropylene oxide by number of residues.

31 - 39 (cancelled)

40. (previously presented) A biocompatible hydrogel-forming tissue-bonding adhesive composition comprising:

a polyol of functionality N, wherein said polyol being terminated with at least one polyisocyanate in solution with at least (N-1)% of said solution comprising free polyisocyanate, wherein said adhesive composition is essentially anhydrous at the time of its application to tissue;

characterized in that after polymerization, upon exposure to tissue or water, the adhesive forms a hydrogel comprising greater than 50% water by volume; and

wherein the composition is suitable for use as a biocompatible tissue-bonding adhesive composition.

41. (previously presented) The biocompatible composition as recited in claim 40 wherein N is in the range 1.5 – 8.

42. (previously presented) The biocompatible composition as recited in claim 40 wherein said polyol is a branched polypropylene/poly-ethylene oxide copolymer.

43. (previously presented) The biocompatible composition as recited in claim 42 wherein said polypropylene/polyethylene oxide copolymer contains polypropylene oxide in a range of about 10% to 30%.

44. (previously presented) The biocompatible adhesive of claim 40 wherein the adhesive is a one-part adhesive consisting essentially of at least one NCO-terminated branched polymer, derived from at least one polymeric polyisocyanate, and at least 1% unreacted low molecular weight ("free") polyisocyanate, wherein the adhesive is characterized in having a reactivity such that

1) free polyisocyanate bonds to tissue,

2) said free polyisocyanate converts to a polyamine and links said NCO-terminated branched polymer to said tissue bonded polyisocyanate;

3) said free polyisocyanate converts to polyamine and links said branched polymer to other said same polymers.

45. (previously presented) The biocompatible adhesive of claim 40 wherein the adhesive is a one-part adhesive consisting essentially of two NCO-terminated branched polypropylene/poly-ethylene oxide copolymers, wherein copolymer A is at most 10% polypropylene oxide and copolymer B is between about 10% and 30% polypropylene oxide, derived from a polymeric polyisocyanate and at least 1% unreacted low molecular weight ("free") polyisocyanate,

wherein the adhesive is characterized in having a reactivity such that

1) free polyisocyanate bonds to tissue,

2) said free polyisocyanate converts to a polyamine and links both A and B type polypropylene/polyethylene oxide copolymers to said tissue bonded polyisocyanate,

3) said free polyisocyanate converts to polyamine and links said branched polypropylene/polyethylene oxide copolymers to other said polymers, and later,

4) polymerized copolymer A swells within the formed polymer matrix and causes degradation of the formed matrix.

46. (previously presented) The biocompatible adhesive of claim 40, wherein the adhesive is a one-part adhesive consisting essentially of two NCO-terminated branched polypropylene/poly-ethylene oxide copolymers, wherein copolymer A is at most 10% polypropylene oxide and copolymer B is between 10% and 30% polypropylene oxide, derived from a polymeric polyisocyanate and at least 1% unreacted low molecular weight ("free") polyisocyanate wherein the adhesive is characterized in having a reactivity such that

1) free polyisocyanate bonds to tissue;

2) said free polyisocyanate converts to a polyamine and links copolymer B preferentially to said tissue bonded polyisocyanate;

3) said free polyisocyanate converts to polyamine and links said branched polypropylene/polyethylene oxide copolymers to other said same polymers;
4) polymerized copolymer A swells within the formed polymer matrix and causes degradation of the formed matrix; and
5) polymerized copolymer B does not swell at the tissue/matrix interface and does not cause tissue bond degradation.

47. (previously presented) The biocompatible composition as recited in claim 40, wherein one polyol is terminated with a polyisocyanate having a first reaction rate with water R1 and another polyol is terminated with a polyisocyanate having a second reaction rate with water R2, where R1>R2, both of said terminated polyols having an average functionality of 1.5-8, said terminated polyols being in solution and with at least 1% of said solution comprising free polyisocyanate of reactivity R1.

48. (previously presented) The biocompatible composition as recited in claim 47 wherein one of said polyols is terminated with an aromatic polyisocyanate and another of said polyols is terminated with an aliphatic polyisocyanate, both of said polyols of functionality 1.5-8, said terminated polymers in solution with at least 1% of said solution comprising free polyisocyanate.